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| EXAMINER | |
|---|---|
| NGUYEN, LEON VIET Q | |
| ART UNIT | PAPER NUMBER |
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/941,371 | KINTIS, MARK | |
| | Examiner | Art Unit | |
| | LEON-VIET Q. NGUYEN | 2611 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *29 January 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-6,12-15 and 28-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6,12-15 and 28-32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 August 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

1. This office action is in response to communication filed on 1/29/09. Claims 1-6, 12-15 and 28-32 are pending on this application.

### *Response to Arguments*

2. Applicant's arguments filed 1/29/09 have been fully considered but they are not persuasive.

### *Response to Remarks*

Regarding claim 1, applicant asserts that Thorson does not suggest modulation of a local oscillator signal and mixing it with an input signal (remarks page 6 third paragraph).

Examiner respectfully disagrees.

Fig. 2 comprises a local oscillator 126 which outputs a phase reference signal 111. This signal is then modulated by a first phase modulator 240 to create a modulated reference signal 131. Signal 131 is then mixed with input signal 219 inside mixer 120.

Also regarding claim 1, applicant asserts that Horiguchi only discloses a single mixer (remarks page 6 fourth paragraph).

Examiner agrees, however one of ordinary skill in the art would have found it obvious to use the features of Horiguchi in place of one of the mixers as taught by

Thorson to synchronize the modulators, which is well known in the art. The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

Further regarding claim 1, applicant asserts that Pitel does not teach using two mixers or connecting two mixers in tandem (remarks page 6 fifth paragraph).

Examiner respectfully disagrees.

Fig. 8b comprises two mixers with the bottom mixer's output fed through modulator 18 and indirectly to the top mixer. The mixers are interpreted to be indirectly coupled. Taking the bottom mixer as a first mixer and the top mixer as a second mixer would read on the limitations as claimed.

In response to applicant's argument that the cited references suggest reducing spurious output signals in the output of the mixer, a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim.

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

**2. Claims 1, 6, 14, 28, and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thorson (US6101225) in view of Horiguchi et al (US6133791) and further in view of Pitel (US4661897).**

Re claim 1, Thorson teaches a mixer circuit for reducing the power level of spurious output signals (fig. 2), the mixer comprising:

a first mixer stage (the upper branch of fig. 2) which includes a first mixer (mixer 120 in fig. 2) with first and second input ports (the input ports receiving signals 219 and 131 in fig. 2) and a first output port (mixer 120 outputs signal 115 in fig. 2), said first input port for receiving an input signal (input signal 219 in fig. 2) and mixing said input signal (signal 219 in fig. 2) with a modulated first local oscillator signal (signal 131 in fig. 2) to generate a first output signal (the output of mixer 120 in fig. 2) having a first frequency and spurious output signals at frequencies other than said first frequency (although not explicitly taught, it is well known in the art that mixers generate spurious output signals at different frequencies);

a second mixer stage (the lower branch of fig. 2) which includes a second mixer (mixer 122 in fig. 2) with third and forth input ports (the input ports receiving signals 221 and 133 in fig. 2) and a second output port (mixer 122 outputs signal 117 in fig. 2), said

first output port if said first mixer electrically coupled said third input port of said second mixer (fig. 2, the input ports are coupled) and generating a second output signal at a second frequency and spurious output signals at frequencies other than said first frequency and said second frequency (although not explicitly taught, it is well known in the art that mixers generate spurious output signals at different frequencies);

a phase modulator (modulator 240 in fig. 2) for phase modulating a first local oscillator signal (signal 111 in fig. 2), said phase modulator electrically coupled to said second input port of first mixer (fig. 2); and

a second phase modulator (modulator 242 in fig. 2) for phase modulating a second local oscillator signal (signal 113 in fig. 2), said second phase modulator electrically coupled to said fourth input port of said second mixer(fig. 2) to produce an output signal at a second output port with reduced spurious signals.

Thorson fails to teach wherein the local oscillator signals are modulated according to a pseudorandom number defining said modulated first and second oscillator signals. However Horiguchi teaches a pseudorandom code generator defining modulated oscillator signals (elements 46, 47, and 51 in fig. 14), controlling phase modulators (element 47 in fig. 14).

Therefore taking the combined teachings of Thorson and Horiguchi as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the feature of Horiguchi into the device of Thorson. The motivation

to combine Thorson and Horiguchi would be to synchronize the modulators, which is well known in the art.

Thorson also fails to teach wherein the second modulator is a pseudorandom phase modulator for modulating a LO signal using the same pseudorandom code as the first phase modulator. However Pitel teaches a second modulator is an inverse phase modulator (inverter 17 in fig. 7) for modulating a LO signal (the output from oscillator 12 in fig. 7) using the same pseudorandom code as the first phase modulator (it would be obvious that modulators 17 and 18 use the same received pseudorandom code). Pitel also teaches mixing said first output signal from said first mixer (the output of the top mixer in fig. 8b which goes through circuit 19) with a modulated second local oscillator signal (the output of the modulation index circuit in fig. 8b).

Therefore taking the combined teachings of Thorson and Pitel as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the feature of Pitel into the device of Thorson. The motivation to combine Thorson and Pitel would be to achieve easy control even when operating at resonance (col. 3 lines 48-49 of Pitel).

Re claim 6, the modified invention of Thorson teaches a mixer circuit further including an intermediate filter (LPF 112 and 114 in fig. 2 of Thorson) coupled between

said first output port (input port corresponding to signal 219 in fig. 2 of Thorson) and one of said third and fourth input ports (input port corresponding to signal 221 in fig. 2).

Re claim 14, the modified invention of Thorson teaches a mixer wherein said modulator and said inverse modulator are configured for M-ary modulation techniques (col. 7 lines 1-11 of Thorson, it would be obvious to use the well known M-ary modulation technique for both modulators).

Re claim 28, all of the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 1. It would be obvious and necessary to have a method of using the apparatus as claimed in claim 1.

Re claim 32, all of the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 14.

**3. Claims 2-5, 12, 29, and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thorson (US6101225) in view of Horiguchi et al (US6133791) and Pitel (US4661897) in view of Underbrink et al (US6754287).**

Re claim 2, the modified invention of Thorson fails to teach a mixer circuit wherein said phase modulator is a phase shift keying (PSK) modulator.

However Underbrink teaches wherein a phase modulator is a phase shift keying (PSK) modulator (col. 7 lines 41-44, col. 9 lines 11-20, PSK is a well known modulation method).

Therefore taking the modified teachings of Thorson, Horiguchi, and Pitel with Underbrink as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the feature of Underbrink into the device of Thorson, Horiguchi, and Pitel. The motivation to combine Underbrink, Pitel, Horiguchi, and Thorson would be to reduce power consumption and enhance reliability (col. 3 lines 2-6 of Underbrink).

Re claim 3, it would have been obvious to use the same PSK modulation scheme for the inverse phase modulator as the first phase modulator in claim 2.

Re claim 4, the modified invention of Thorson teaches a mixer circuit wherein said phase modulator is a first direct sequence binary phase shift keying (BPSK) modulator (col. 9 lines 13-15 of Underbrink) modulated according to a pseudorandom number code (the output of element 51 in fig. 14 of Horiguchi) and said mixer circuit includes a PN code generator for generating said PN code (element 51 in fig. 14 of Horiguchi).

Re claim 5, the modified invention of Thorson teaches a mixer wherein said inverse phase modulator is a second direct sequence binary phase shift keying modulator (col. 9 lines 13-15 of Underbrink) modulated according to said PN code (the output of element 51 in fig. 14 of Horiguchi).

Re claim 12, the modified invention of Thorson fails to teach a mixer wherein said modulator and said inverse modulator are configured for QPSK modulation.

However Underbrink teaches wherein a modulator and an inverse modulator are configured for QPSK modulation (col. 9 lines 13-17).

Therefore taking the modified teachings of Thorson, Horiguchi, and Pitel with Underbrink as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the feature of Underbrink into the device of Thorson, Horiguchi, and Pitel. The motivation to combine Underbrink, Pitel, Horiguchi, and Thorson would be to reduce power consumption and enhance reliability (col. 3 lines 2-6 of Underbrink).

Re claim 13, all of the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claims 2 and 3.

Re claim 29, all of the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claims 4 and 5.

Re claim 30, all of the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 12.

**4. Claims 15 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thorson (US6101225) in view of Horiguchi et al (US6133791) and Pitel (US4661897) in view of Scott (US5784403).**

Re claim 15, the modified invention of Thorson fails to teach a mixer wherein said modulator and said inverse modulator are configured for GMSK modulation techniques.

However Scott teaches a modulator configured for GMSK modulation techniques (col. 18 line 60). It would be obvious to use the well known GMSK modulation for both modulators.

Therefore taking the modified teachings of Thorson, Horiguchi, and Pitel with Scott as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the feature of Scott into the device of Thorson, Horiguchi, and Pitel. The motivation to combine Scott, Pitel, Horiguchi, and Thorson would be to reduce the bandwidth required to modulate signals, which is a well known advantage of GMSK modulation.

Re claim 31, all of the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 15.

***Conclusion***

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LEON-VIET Q. NGUYEN whose telephone number is (571)270-1185. The examiner can normally be reached on Monday-Friday, alternate Friday off, 7:30AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David C. Payne can be reached on 571-272-3024. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Leon-Viet Q Nguyen/
Examiner, Art Unit 2611

/David C. Payne/
Supervisory Patent Examiner, Art Unit 2611